

ABSTRACT

AIM: The aim of the study is to place a stable implant with adequate dimension in deficient maxilla in a single stage procedure and assess the success of implant. The success is assessed by the stability of implant and bone dimension after a period of 6 months.

MATERIALS AND METHODS: The study was conducted in the Department Of Oral and Maxillofacial Surgery, Ragas Dental college, Tamilnadu. Twelve implant sites in seven patients irrespective of gender were selected with reduced facio-palatal width of maxillary alveolar ridge with chief complaint of partial edentulism and need of fixed prosthesis, were included in study. All these patients were provided with a treatment for implant placement in maxilla using bone expanding and condensing osteotome (Equinox Bone expanding osteotome kit which belongs to UNITI™) with size of '2.0,'2.8,'3.2,'3.8 mm according to desired implant width . The crestal width was measured with the help of Cone Beam computed tomography using CS 3D imaging viewer software, which was ≥ 3 mm width and ≤ 5 mm in diameter facio – palatally for all patients. Measurements of crestal width of surgical site pre-operatively (W_0) and Six month Post operatively (w_1) . Intra Oral periapical radiograph were taken intra operatively and post operatively to assess the crestal bone loss measurement. The mean intraoperative crestal bone margin (T_0) and Postoperative crestal bone margin (T_1) in relation to

implant collar and Resonance Frequency Analysis (Osstell™) were used to measure implant stability in Implant stability Quotient (ISQ) before pre prosthetic loading.

RESULTS: Twelve implants placed in partial edentulous ridge associated with horizontal resorption of the ridges were treated by bone condensing and Osteotome technique to obtain a wider bony base for better placement of the implants. Implants inserted were in the range of 3.4 – 4.8mm in diameter, and between 10 and 15mm long. The mean expansion achieved was in the range of (0.7mm – 1.8mm) with the mean value of $1.1\text{mm} \pm 0.45\text{mm}$. P value is 0.005 and it is statistically significant according to *Wilcoxon signed-rank test*. These measurements were made with the help of CBCT using Carestream Dental 3D Imaging software. Endosseous titanium implants were inserted. The mean crestal bone resorption was in range of $(1.4\text{mm} \pm 0.4\text{mm})$ with P value of 0.04 which shows statistically significance difference according to *Wilcoxon signed-rank test*. These measurements were made with the help of intra oral periapical radiograph film. Resonance Frequency analysis (Osstell™) were done for all 12 implants before pre prosthetic loading which showed good secondary stability of 11 implants in the range of 65 – 72 in ISQ (Implant Stability Quotient) value. Whereas One implant showed less secondary stability of 48 ISQ (Implant Stability Quotient) value which was left without prosthetic loading for another six months. All other implants were prosthetically rehabilitated. Within the limits of this study this technique

seems to be reliable and simple with little morbidity, and rehabilitation was as good as that after other techniques such as autogenous bone grafts or guided bone regeneration. Survival and the success of all implants were good.

CONCLUSION: The bone expansion technique in the maxilla with bone expansion osteotomes is a stable and consistent with a predictable success rate which showed good width achievement in horizontally resorbed maxillary alveolus. And all implants showed considerable crestal bone loss of about 0.8mm to 1.2 mm which does not affect any secondary stability. Though the technique acts as a life-line in narrow maxillary ridge cases where otherwise implant placement is not possible yet this technique is sensitive to judicious use of osteotomes as there is a risk of jeopardizing the buccal bone by improper orientation of the osteotome and unwise malleting. Consistent with the other similar studies our study showed a high successes rate and post operative survival rate of implants placed by osteotomy technique. Thus in our study the technique of alveolar bone expansion in the maxilla for simultaneous implant placement with bone expansion osteotomes show a reliable outcome and long term stability.

KEYWORDS: Single stage implants placement, narrow ridge, bone expansion, bone expanding osteotome, width achievement, crestal bone resorption, RFA.